Application No. 10/528,974
Response Dated February 20, 2008
Reply to Office Action of November 20, 2007

Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (previously presented) A process for preparing a compound of formula (I)

$$R^{5}$$
 S N H (I)

wherein

 R^4 and R^5 are independently selected from hydrogen, halo, nitro, cyano, hydroxy, fluoromethyl, difluoromethyl, trifluoromethoxy, amino, carboxy, carbamoyl, mercapto, sulphamoyl, ureido, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, C_{1-6} alkanoyl, C_{1-6} alkanoyloxy, $N-(C_{1-6}$ alkyl)Ramino, R

N-(C₁₋₆alkyl)carbamoyl, N,N-(C₁₋₆alkyl)₂carbamoyl, C₁₋₆alkylS(O)_a wherein a is 0 to 2,

C₁₋₆alkoxycarbonyl, C₁₋₆alkoxycarbonylamino, *N*-(C₁₋₆alkyl)sulphamoyl,

N,N,-(C₁₋₆alkyl)₂sulphamoyl, C₁₋₆alkylsulphonylamino, and C₁₋₆alkylsulphonyl-N-

(C₁₋₆alkyl)amino; and

R⁶ is hydrogen or a protecting group,

which process comprises cyclisation of a compound of formula (II)

$$R^{4}$$
 CHO $COOR^{6}$ R^{5} R^{7} (II)

wherein

 $\mbox{R}^{4},$ $\mbox{R}^{5},$ and \mbox{R}^{6} are as defined in relation to formula (I); and

R⁷ is a nitrogen protecting group; and

removing protecting group R⁷, and thereafter if desired or necessary, removing any protecting group R⁶ to obtain the corresponding carboxylic acid.

2. (previously presented) A process according to claim 1, wherein the protecting group R⁷ is removed during the cyclisation.

3. (previously presented) A process according to claim 1, wherein in a structure of formula (II), R⁷ is a group of sub-formula (i)

wherein R⁸ is a straight chain alkyl group of from 1 to 6 carbon atoms.

4. (previously presented) A process according to claim 1, wherein R^4 and R^5 are independently selected from hydrogen, halo, nitro, cyano, fluoromethyl, difluoromethyl, trifluoromethyl, trifluoromethoxy, carboxy, carbamoyl, sulphamoyl, C_{1-4} alkyl, C_{2-4} alkenyl, C_{2-4} alkynyl, C_{1-4} alkoxy, C_{1-4} alkanoyl, and C_{1-4} alkanoyloxy.

5 - 10. (cancelled)

11. (previously presented) A method according to claim 1, for the production of a second compound of formula (I) where R⁶ is hydrogen, further comprising reacting a first compound of formula (I) with an amine of formula (XI),

$$\begin{array}{c|c}
 & R^{14} & R^{15} \\
 & N & R^{16} \\
 & R^{16} \\
 & (XI)
\end{array}$$

where R^{14} is selected from hydrogen and $C_{1\text{-8}}$ alkyl;

m is an integer of from 0 to 4;

each R¹⁵ is the same or different and is selected from hydrogen, halo, nitro, cyano, hydroxy, amino, carboxy, carbamoyl, mercapto, sulphamoyl, ureido, C₁₋₆alkyl, C₂₋₆alkenyl, C₂₋₆alkynyl, C₁₋₆alkoxy, C₁₋₆alkanoyl, C₁₋₆alkanoyloxy, *N*-(C₁₋₆alkyl)amino, *N*,*N*-(C₁₋₆alkyl)₂amino, C₁₋₆alkanoylamino, *N*-(C₁₋₆alkyl)carbamoyl, *N*,*N*-(C₁₋₄alkyl)₂carbamoyl, C₁₋₆alkylS(O)_a wherein a is 0 to 2, C₁₋₆alkoxycarbonyl, C₁₋₆alkoxycarbonylamino, *N*-(C₁₋₆alkyl)sulphamoyl, *N*,*N*-(C₁₋₆alkyl)₂sulphamoyl, C₁₋₆alkylsulphonylamino, C₁₋₆alkylsulphonyl-*N*-(C₁₋₆alkyl)amino, C₃₋₈cycloalkyl, C₃₋₈cycloalkylC₁₋₆alkyl, aryl, arylC₁₋₆alkyl, heterocyclic group, and (heterocyclic group)C₁₋₆alkyl; wherein R¹⁵ may be optionally substituted on carbon with one or more P groups,

Application No. 10/528,974
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and if said heterocyclic group contains an -NH- moiety, that nitrogen may be optionally substituted with an R group;

each R¹⁶ is the same or different and is selected from hydrogen and C₁₋₆alkyl;

 R^{17} is selected from hydrogen, halo, nitro, cyano, hydroxy, fluoromethyl, difluoromethyl, trifluoromethyl, trifluoromethoxy, amino, carboxy, carbamoyl, mercapto, sulphamoyl, ureido, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-6} alkoxy, C_{1-6} alkanoyl, C_{1-6} alkanoyloxy, N- $(C_{1-6}$ alkyl)amino, N- $(C_{1-6}$ alkyl) $_2$ amino, C_{1-6} alkanoylamino, N- $(C_{1-6}$ alkyl)carbamoyl, N- $(C_{1-6}$ alkyl) $_2$ carbamoyl, N- $(C_{1-6}$ alkyl)-N- $(C_{1-6}$ alkoxy)carbamoyl, N- $(C_{1-6}$ alkyl) $_2$ sulphamoyl, N- $(C_{1-6}$ alkyl) $_2$ sulphamoyl, sulphamoylamino, N- $(C_{1-6}$ alkyl)sulphamoylamino, N- $(C_{1-6}$ alkyl)sulphamoylamino, N- $(C_{1-6}$ alkyl)sulphamoylamino, N- $(C_{1-6}$ alkyl)sulphonylamino, N- $(C_{1-6}$ alkyl)amino, and a group -E-F-G-H;

E and G are independently selected from a direct bond, -O-, -S-, -SO-, -SO₂-, -OC(O)-, -C(O)O-, -C(O)-, -NR^a-, -NR^aC(O)-, -C(O)NR^a-, -SO₂NR^a-, -NR^aSO₂-, -NR^aC(O)NR^b-, -OC(O)NR^a-, -NR^aC(O)O-, -NR^aSO₂NR^b-, -SO₂NR^aC(O)-, and -C(O)NR^aSO₂-; R^a and R^b are independently selected from hydrogen and C_{1-6} alkyl which is optionally substituted with a V group;

F is C₁₋₆alkylene optionally substituted by one or more Q or a direct bond;

H is selected from aryl, C₃₋₈cycloalkyl, and heterocyclic group; wherein H may be optionally substituted on carbon with one or more S groups, and if said heterocyclic group contains an -NH- moiety, that nitrogen may be optionally substituted with a T group;

P, S, and Q are independently selected from halo, nitro, cyano, hydroxy, trifluoromethyl, trifluoromethoxy, amino, carboxy, carbamoyl, mercapto, sulphamoyl, ureido, C₁₋₆alkyl, C₂₋₆alkenyl, C₂₋₆alkynyl, C₁₋₆alkoxy, C₁₋₆alkanoyl, C₁₋₆alkanoyloxy, *N*-(C₁₋₆alkyl)amino, *N*,*N*-(C₁₋₆alkyl)₂amino, C₁₋₆alkanoylamino, *N*-(C₁₋₆alkyl)carbamoyl, *N*,*N*-(C₁₋₆alkyl)₂carbamoyl, *N*-(C₁₋₆alkyl)-*N*-(C₁₋₆alkoxy)carbamoyl, C₁₋₆alkylS(O)_a wherein a is 0 to 2, C₁₋₆alkoxycarbonyl, C₁₋₆alkoxycarbonylamino, *N*-(C₁₋₆alkyl)sulphamoyl, *N*,*N*-(C₁₋₆alkyl)₂sulphamoyl, C₁₋₆alkylsulphonylamino, C₁₋₆alkylsulphonyl-*N*-(C₁₋₆alkyl)amino, C₃₋₈cycloalkyl, aryl, and heterocyclic group; wherein P, S, and Q may be optionally independently substituted on carbon with one or more V groups and if said heterocyclic group contains an -NH- moiety, that nitrogen may be optionally substituted by a U group;

V is selected from halo, nitro, cyano, hydroxy, trifluoromethoxy, trifluoromethyl, amino, carboxy, carbamoyl, mercapto, sulphamoyl, methyl, ethyl, methoxy, ethoxy, acetyl, acetoxy, methylamino, ethylamino, dimethylamino, diethylamino, N-methyl-N-ethylamino, acetylamino,

Application No. 10/528,974
Response Dated February 20, 2008
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N-methylcarbamoyl, *N*-ethylcarbamoyl, *N*,*N*-dimethylcarbamoyl, *N*,*N*-diethylcarbamoyl, *N*-methyl-*N*-ethylcarbamoyl, methylthio, ethylthio, methylsulphinyl, ethylsulphinyl, mesyl, ethylsulphonyl, methoxycarbonyl, ethoxycarbonyl, *N*-methylsulphamoyl, *N*-ethylsulphamoyl, *N*-dimethylsulphamoyl, *N*,*N*-diethylsulphamoyl, *N*-methyl-*N*-ethylsulphamoyl, morpholino, morpholinocarbonyl, *N*- benzylcarbamoyl, and 4-hydroxypiperidinocarbonyl;

R, T, and U are independently selected from C_{1-4} alkyl, C_{1-4} alkanoyl, C_{1-4} alkylsulphonyl, C_{1-4} alkoxycarbonyl, carbamoyl, N-(C_{1-4} alkyl)carbamoyl, N-(C_{1-4} alkyl)carbamoyl, phenyl, benzyl, benzyloxycarbonyl, benzoyl, and phenylsulphonyl; wherein R, T, and U may be optionally independently substituted on carbon with one or more V groups; to produce a compound of formula (XII)

$$\begin{array}{c|c}
R^4 & R^{14} & R^{15} \\
\hline
R^5 & N & O & R^{16}
\end{array}$$
(XII)

where R⁴, R⁵, R¹⁵, R¹⁶, R¹⁷, and m are as defined above, or a pharmaceutically acceptable salt or an *in vivo* hydrolysable ester thereof.